FIELD NOTES

January - December 2009

2009 Stewardship Review

Now that 2009 has come to a close, it is clear that it has become a milestone year for natural resource management in the Division. The addition of an AmeriCorps crew this year has put a dent in a number of exotic species from Carolina Beach to Pilot Mountain. Funding for a seasonal fire crew saw the fire management program expand from an average of 200 acres per year to almost 2000 acres in 2009. In addition, funding from the NC Division of Forest Resources was used to treat more than 500 hemlock trees being impacted by the rapidly spreading hemlock wooly adelgid.

The accomplishments of this year have set a high standard for years to come in the stewardship of our natural resources. We look forward to another record-setting year in 2010 as we continue to advance natural resource management throughout the system. I hope this inaugural edition of Field Notes will give you a clear understanding of the impressive accomplishments the Division realized in 2009. I encourage you to read about all the efforts throughout the Division to preserve and protect our unique natural resources.

Brian Strong
Head, DPR Natural Resources Program

Above: Prescribed fire at Lumber River. Photo by Brian Strong. Center: An Americorps worker removing exotic species at Jordan Lake. Photo by Charlie Peek. Right: Pitcher plants at Sandy Run Savannas. Photo by Brian Strong.

Resource Management Highlights from the Coastal Region

Following are some projects that occurred in DPR's coastal region parks in 2009.

Coastal region parks treated about 20 acres of invasive plants and conducted more than 550 acres of prescribed burns.

Jockey's Ridge and Hammocks Beach state parks conducted shoreline and salt marsh restoration projects in partnership with the NC Coastal Federation (NCCF). Park staff, NCCF staff and volunteers planted salt marsh cordgrass (Spartina alterniflora) and placed oyster shell sills to protect the new marsh and shoreline from wave erosion. The Hammocks Beach project was conducted at the newly acquired Jones Island.

Oyster shell sill protecting the newly planted salt marsh cordgrass at Jockey's Ridge. Photo by Erin Fleckenstein, N.C. Coastal Federation.

Fort Fisher initiated a long-term monitoring project on the nesting success of American oystercatchers, an important focal species at the coast. Jones Lake and Singletary Lake continued their long-term management of red-cockaded woodpeckers. Lumber River is assisting Audubon North Carolina in looking for ivory-billed woodpecker habitat along the river.

Jones Lake planted 150 long leaf pine seedlings at Jones Lake and Bushy Lake State Natural Area. The seedlings were donated by the NC Forest Service.

Pettigrew has taken on the DPR's first hydrologic restoration project in peatlands. The park will install water control structures on the ditches that currently drain the 500-acre Pocosin Natural Area in partnership with the U.S. Fish and Wildlife Service. This will retain more water in the wetland, restoring wetland functions and values and sequestering carbon in the process.

Carolina Beach and Goose Creek made tremendous progress in their fire and invasives programs. Both parks completed long-awaited prescribed fires, totaling about 450 acres. They also treated Phragmites and privet.

Cliffs of the Neuse began working to remove invasive privet, chinaberry, honeysuckle and wisteria in the park. They have also worked on fire lines at Sandy Run Savannas State Natural Area, in preparation for prescribed fire and restoration that will begin in early 2010.

Resource Management Highlights from the Coastal Region (cont.)

Lumber River led the removal of 3,500 pounds of trash from the river and riverbank in October's Big Sweep.

Fort Macon opened DPR's first LEED (Leadership in Energy and Environmental Design)-certified visitor center.

Park visitors enjoying the division's first LEED-certified visitor center at Fort Macon. Photo by Charlie Peek.

Several parks installed rain gardens, rain barrels and outdoor cisterns, from 55 gallons to 1000 gallons, to capture roof runoff, conserve water and reduce stormwater impacts.

Lake Waccamaw has developed a long-term water quality monitoring program for the lake. This volunteer-based program was created with many partners. Another coup for water quality at Lake Waccamaw is the park's recent acquisition of the 440-acre Cove Swamp, also achieved through the efforts of many partners.

Coastal Region Fights Phragmites Australis

Jean Lynch, Coastal Region Biologist

In 2009 several of the coastal region parks began or expanded their efforts to fight the invasive exotic plant common reed (Phragmites australis). Carolina Beach, Fort Fisher, Hammocks Beach, Fort Macon, Goose Creek, Pettigrew and Jockey's Ridge have all identified Phragmites on their properties. The parks have mapped more than 22 acres and treated roughly 12 acres with herbicide. The work has been promising and the effort will continue for the next several years.

The presence of this tall, invasive exotic grass concerns DPR staff because of the plant's impacts on native species and ecological communities. Phragmites is a rapid colonizer of disturbed wet or damp areas. It forms dense monocultures up to thirteen feet tall and creates conditions that favor its own dominance by shading out other plants, exuding root chemicals that damage the fine root structures of competing plants and by changing local hydrology and soil characteristics. Native plants that once performed well tend to decline in response to these changes. They often are rapidly displaced by the new competitor.

Coastal Region Fights Phragmites Australis (cont.)

The Fort Macon staff were the first to work on eradicating Phragmites from Theodore Roosevelt State Natural Area in 2006. In 2007 Pettigrew began working on small patches of Phragmites around the shores of Lake Phelps. In 2008 Carolina Beach, Fort Fisher and Goose Creek mapped most of the Phragmites on their properties and began annual treatments. Since then, Hammocks Beach and Jockey's Ridge have worked on patches in their parks and mapping, planning and implementation continue at all of these parks.

Fort Macon Phragmites site - before eradication, after treament and regrowth of native plants.

Photos by Randy Newman

Like all invasives, this plant is tough and fighting it takes persistence and hard work. DPR has received labor, equipment, technical expertise and herbicides through a cost-share program headed up by the Division of Water Resources' Aquatic Weed Control program chief, Rob Emens. He and his field technicians usually work side by side with DPR, but occasionally they have conducted control work even on days when DPR staff were not available to assist.

Carolina Beach was able to run fire through about an acre and a half of Phragmites. Burning removed most of the standing Phragmites and a good deal of the ground litter. Spraying the regrowth a few weeks later was much easier than spraying a nine-foot-high monoculture and the new growth remains short, so follow-up spraying should be easier in 2010.

The coastal parks will continue their effort to contain and eradicate this invasive exotic plant. Future strategies will include herbicide use and mowing. Fire will continue to be used as an alternative to mowing when appropriate. For large and difficult-to-access patches at Carolina Beach, Pettigrew and Run Hill State Natural Area, DPR may explore helicopter application of herbicide, such as has been done by the U.S. Fish and Wildlife Service on the Albemarle peninsula and the Outer Banks.

Planning for Prescribed Fire: Varying the Seasonality of Burns

Doug Sprouse, Ecological Burn Coordinator

Traditionally in the southeastern United States, land managers have used the cool, dry weather of the winter months to burn their land for fuel reduction and to benefit wildlife without damaging valuable timber. Repeated winter burns are a great way to remove fuel under relatively safe conditions. The leaf litter and small woody fuels dry out quickly when exposed to the sun, while a generally moist seasonal climate keeps soils and duff layers damp. Also, most of the above-ground vegetation is dormant during the short winter days, thus protecting the plants from a certain amount of damage from fire and frost. This is all great for reducing fuels, but what about the effects on ecosystems? Ecosystems are maintained by complex processes; drought, wind, flood and fire all have important roles in our ecosystems. Fire plays a major role in sustaining North Carolina ecosystems by influencing the populations of native shrubs, grasses and trees. If we want to successfully use fire to effect ecosystem change, burning when plants are least susceptible to fire may not be the best timing for use of this tool.

Fire Management Terms to Know: Winds

Eye Level: Wind speed and direction measured at eye level.
Surface Wind: The wind measured 20 feet above the average top of the vegetation. Often a combination of local and general winds. Also known as "20 foot winds."
Effective Wind Speed: The midflame wind speed adjusted for the upslope effect on fire spread.
Midflame Winds: The wind that acts directly on the flaming fire front at a level one-half the flame height. This is the wind speed that affects a surface fire and is used in the mathematical fire behavior prediction models.
Free Air: The wind speed and direction at a level in the atmosphere free from the effects of friction and terrain.
Drainage: Normal nighttime airflow directed downslope or downvalley, caused by cooling of the air near the earth's surface. Air sinking toward lower elevations is usually quite gentle (light) in nature.
Transport Winds: The mean wind speed and direction of all measured winds within the mixed layer.
Wind Driven Fire: A fire in which the local and/or topographic winds have the overriding control on the rate of spread and growth of a fire. The power of the wind is greater than the power of the fire.
Wind Direction: The direction from which a wind originates. It is usually reported in cardinal directions or in azimuth degrees.

When treating an area with fire during a certain month of the year, under very specific conditions, you do effect change upon that ecosystem. But when you apply fire to that area again after two, five, ten, or more years during the same month under very similar conditions, you reproduce similar effects upon that ecosystem. If you are not getting the response that you want from those burns, you may want to look at varying the seasonality and conditions of your burns. One example would be a land manager who wants to reduce some percentage of certain midstory trees through burning. Many land mangers wonder why one pesky tree species seems good and dead after each burn, but then sprouts back, requiring use of herbicides or manually removing the target species. For many tree species, pushing your burns in to what is known as the "growing season" (the period when the trees are actually growing, usually after leaves have formed) will actually kill individual trees and not just top-kill them. Because the trees are putting their energy in to growth during the growing season, a fire during this period puts quite

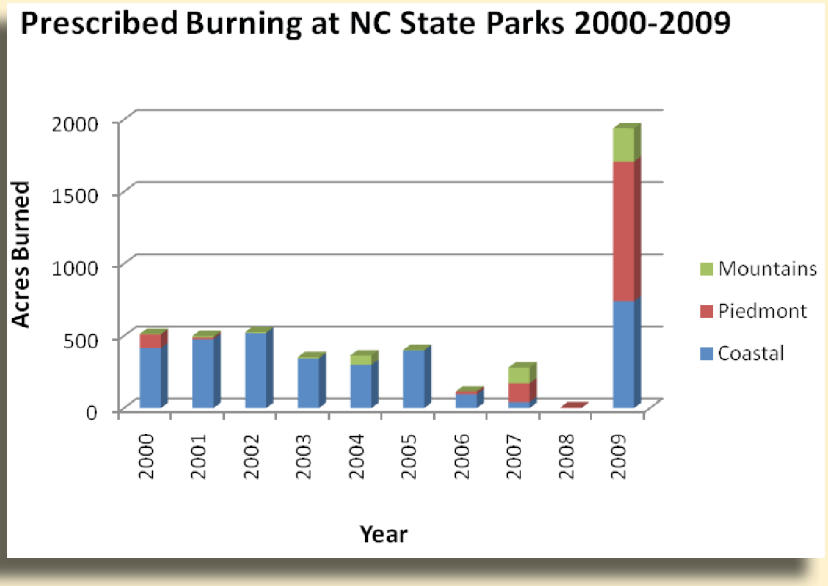
a bit more stress upon the tree than when the tree is dormant. The same theory works for understory shrubs, which in many parts of North Carolina grow very dense and shade out many native grasses and forbs without frequent growing-season burns. Many of our native shrubs will be top-killed and very much consumed during winter burns, but a growing season burn will additionally reduce plant population numbers, making room for other species to thrive.

Fires have occurred naturally at all times of the year in North Carolina and our ecosystems and habitat types evolved with a variety of fire seasons. If we are managing the land for the health of these systems and even to reach very specific management goals, we can and need to begin varying the seasonality of our burns. With proper planning and a well-trained crew, growing season burns can be conducted safely without major damage to the resources.

Prescribed Fire Summary

Doug Sprouse, Ecological Burn Coordinator

Prescribed burning has been used by the North Carolina Division of Parks and Recreation since 1974 to reduce hazardous fuel loads, to restore/maintain specific habitats, and to preserve rare species populations within state parks, recreation areas, and natural areas. The year 2009 marked the 35th anniversary of the first prescribed fire conducted by state parks staff, at Weymouth Woods Sandhills Nature Preserve. Since that day State Parks prescribed fire activity has risen and waned, reaching a peak in 2002 with a total of 538 acres burned for that year. Since 2002 the annual acreage burned by state parks staff has declined drastically, reaching a low during the drought of 2008, with long burn bans in place and five acres burned Division-wide.



In 2009, North Carolina State Parks was able to secure an agreement with the Natural Resources Conservation Service under its Wildlife Habitat Improvement Program to support prescribed fire on State Parks property. State Parks would be reimbursed on a per-acre basis to conduct controlled burns on its property. This allowed State Parks to hire a seasonal fire crew, to increase the number of acres burned per year. In 2009, with the assistance of the fire crew, the Division was able to burn almost 2000 acres. This represents a 400 percent increase over the Division's best year of burning. This grant will remain in place for the next five years and the division hopes to continue the trend of increased prescribed fire in the parks.

Resource Management Highlights from the Piedmont Region

Following are some projects that occurred in DPR's piedmont region parks in 2009.

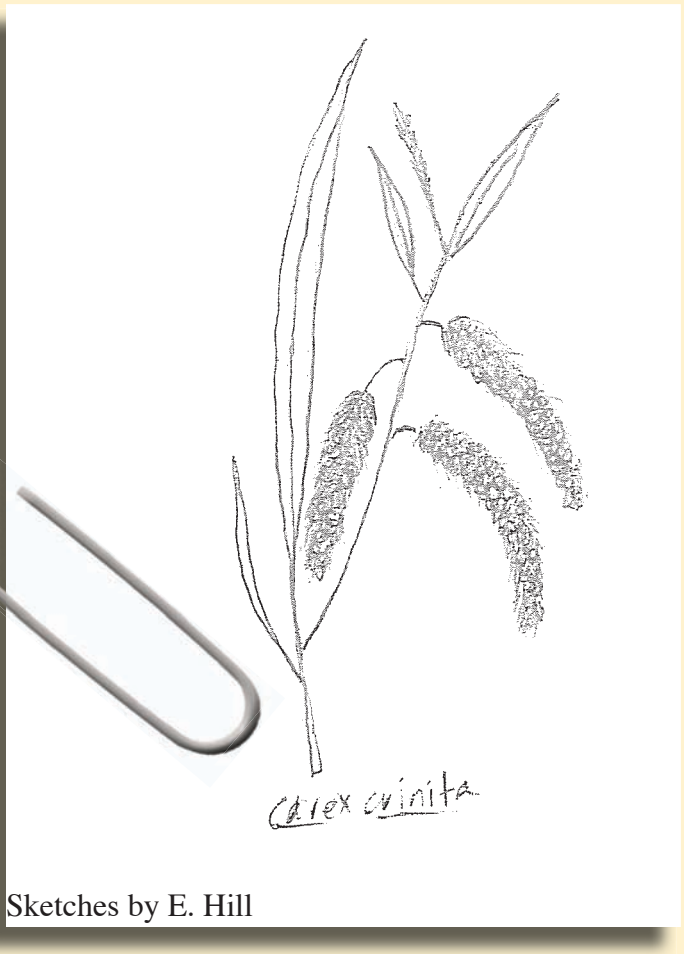
The second and largest prescribed burn to date at William B. Umstead was conducted in March. The burn unit included a population of the federally endangered Michaux's sumac (Rhus michauxii), a fire-dependent plant species.

Dismal Swamp State Park began collaborating with Great Dismal Swamp National Wildlife Refuge to install two water control structures on ditches within the park. The project is funded by grants from Ducks Unlimited and the U.S. Fish and Wildlife Service. The structures will facilitate hydrologic restoration to 9,580 acres of wetlands and provide safer conditions for future prescribed burns.

Natural Resources staff completed their fifth season of bird banding at Eno River.

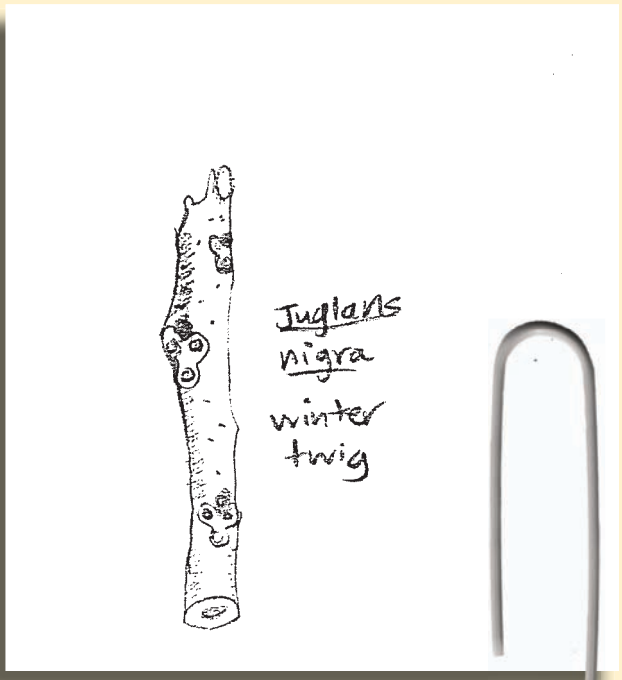
The Division partnered with the Aquatic Weed Control Program, the Army Corps of Engineers, and the City of Raleigh to control Creeping Water Primrose (Ludwigia grandiflora ssp. hexapetala), an invasive aquatic plant, in the Beaverdam subimpoundment at Falls Lake.

Members of the North Carolina Sandhills Weed Management Area mapped and/or treated 146 occurrences of invasive exotic plants at Weymouth Woods and Carver's Creek.



Sketches by E. Hill

Natural Resources Program staff and park staff collaborated with Friends of the Mountains-to-Sea Trail to route a new section of the trail through Eno River.



Volunteers Boost Resource Management in 2009

Emily Hill, Piedmont Region Biologist

Division of Parks and Recreation staff work hard every day to achieve resource management goals in our parks, recreation areas, and natural areas, but we always welcome extra help. It's amazing what a group of 10 or 12 people can accomplish in one day. This year we were fortunate to have volunteers from local businesses and the Americorps National Civilian Community Corps (NCCC), among others, lending a hand on a variety of projects.

Employees from Netapp, a computer data storage company in Research Triangle Park, volunteered with us at William B. Umstead, Falls Lake, Mitchells Mill and Eno River, for a total of 560 person-hours in 2009. Organized by Chris Reno, a Netapp employee and the son of retired Umstead maintenance mechanic Fred Reno, they helped control five acres of wisteria, prepared hundreds of yards of fire lines, built new trail stairs, removed 50 tires and two truckloads of trash and prepared a new section of the Mountains-to-Sea Trail.

Twenty volunteers from another local company, American Tower, spent a day in June cutting invasive wisteria vines at an old homesite in William B. Umstead State Park. Their workday was coordinated by William B. Umstead park staff and by Triangle Impact, an organization that matches volunteer groups with projects in the Triangle area.

A group of eight Americorps NCCC members volunteered in state parks for five weeks in August and September. They began at Carolina Beach and worked their way west to William B. Umstead, Jordan Lake, Morrow Mountain and Pilot Mountain. They removed exotic invasive plants, performed trail maintenance, built foot bridges, set up and sampled fire effects monitoring plots, collected native grass seed for restoration and removed trash and debris. They were joined at Jordan Lake by DENR secretary Dee Freeman, who spent a morning helping them treat invasive autumn olive. The group camped in tents during the majority of their stay and despite the heat, ticks, and chiggers, they were ever cheerful and hardworking. In exchange for their work, DPR staff provided them with training in several aspects of natural resource management. Their work in NC state parks was one part of the team's year of service to their country; they also built houses for hurricane victims along the Gulf of Mexico, created a community garden in an impoverished neighborhood in New Jersey and rebuilt a battered women's shelter destroyed by fire in western North Carolina. Natural Resources Program staff have applied for another Americorps NCCC team for 2010.

Netapp volunteers, along with Amin Davis and Emily Hill of the Natural Resources Program and Ranger Michael Willaford (not pictured) filled the dump truck twice with tires and bags of trash removed from Mitchells Mill State Natural Area. Photo by Michael Willaford.

Environmental Permitting Review: The Basics

Amin Davis, Environmental Review Coordinator

Any activity such as construction, improvements, or maintenance within state parks or other DPR properties that may impact waters of the U.S. (streams, rivers, lakes, and/or wetlands) may be subject to Section 404/401 permitting requirements. When a new construction project, or expansion of existing facilities (visitor centers, trails, and campgrounds, for example) is proposed, the Natural Resources Program should be consulted to assess potential environmental impacts and the need for permits. Although there are many different types of environmental permits and many different levels of regulatory authority ranging from federal to municipal agencies, many of these permitting requirements are related to Sections 404 and 401 of the federal Clean Water Act (CWA). The CWA originally became federal law as the Federal Water Pollution Control Act (FWPCA) of 1948 and was significantly amended to its present form in 1977. The FWPCA was the first major federal law to address water pollution in the U.S. The purpose of the CWA is to maintain clean water and restore impaired "waters of the U.S." by protecting wetlands and surface waters such as streams, rivers and lakes. However, the CWA does not include specific protection of groundwater resources.

Following is a fact sheet that covers common permitting issues in state parks.

Section 404/401 Permitting 101

Context: Clean Water Act [CWA 1972], Sections 404, 401 [Permits and Licenses]
Purpose: Maintain clean water and restore impaired "Waters of the U.S." (streams, rivers, lakes, wetlands)
CWA Permitting Mantra: AVOID & MINIMIZE IMPACTS to Waters of the U.S.!
Jurisdiction: EPA has delegated authority to the U.S. Army Corps of Engineers [Section 404 of CWA] and NC DENR, Division of Water Quality [Section 401 of CWA] to administer CWA.
Permitting: Based on type of activity, extent of impacts, and specific environment impacted

Types of Permits
Nationwide Permits: for "minor" impacts (<1/2 acre wetlands, 300' of stream) to Waters of the U.S.
Individual Permits: for "major" impacts (>1/2 acre wetlands, 300' of stream) to Waters of the U.S.

Typical Review Times
USACE: 45 days
DWQ: 60 days

Permit Application Fees:
$240 for minor water quality applications (<1 acre wetlands, 150' of stream)
$570 for major water quality applications (>1 acre wetlands, 150' of stream)

Other Types of Environmental Permitting & Agencies:
Coastal Area Management Act "CAMA" (NC Division of Coastal Management)
FEMA Floodplain (NC Division of Emergency Management)
Riparian Buffer Rules (DWQ)
State Historic Preservation Office "SHPO" (NC Division of Cultural Resources)
State Stormwater Programs* (NC DWQ)
Endangered Species Act (U.S. Fish and Wildlife Service)

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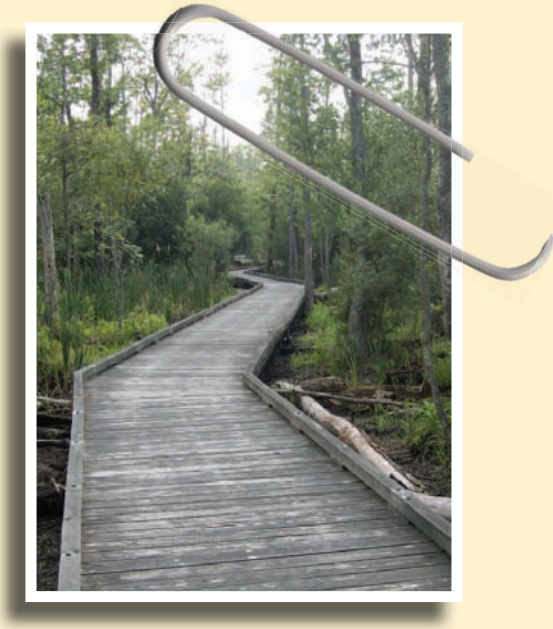
* Stormwater/sediment and erosion control permitting that does not fall under CWA Sections 404/401 is usually handled by engineering consulting firms under contract with DPR.

Take-Home Message: Any activity such as development, improvement or maintenance within DPR properties that may impact waters of the U.S. (streams, rivers, lakes, wetlands) may be subject to Section 404/401 permitting. Additional permits may also be required. Any questions? Please contact myself or your Natural Resources Program Regional Biologist.



Palmetto Boardwalk at Goose Creek. Photo by Kevin Bischof.

Issuing Permits for Research in North Carolina State Parks

Ed Corey, Inventory Biologist

Recently, I've received several questions about Research Activity Permits (RAPs) and the RAP process, and some newly promoted park superintendents may be unaware of the process. RAPs are agreements between DPR and researchers, whereby the researcher is allowed to study on park property, in exchange for providing a copy of their results to the park at the culmination of their research. These permits can vary in length from one day to three years and they are renewable.

As a PASU, what should you do when a researcher asks about working in the park?

1. Make sure they have filled out the online RAP application.
2. Review the permit at the park level. If you are comfortable with the conditions of the research, proceed to the next step. If not, consult with your regional biologist or the inventory biologist.
3. Forward a copy of the entire proposal and application to the inventory biologist for review. The inventory biologist will provide a number for the permit (typically in the form RYY-XX, where "Y" is the year).
4. Decide if the project concerns your park alone or multiple parks within either your district or across districts. If it is park specific, you will provide the final signature. If it spans multiple parks, either the District Superintendent or the Chief of Operations will have final sign-off.
5. Make sure that a report is provided by the scientist. If it is a single-year permit, the report should be handed in no later than January 31 of the following year. If it is a multiple-year permit, the researcher should provide yearly progress reports until their study is completed and a final report at the end of the study. Once you have received a copy of this report, pass a copy along to the inventory biologist for record keeping.

As always, if there are any questions regarding this process, feel free to contact Natural Resources Program staff and we will be happy to help.

Inventorying and Monitoring in North Carolina State Parks: An Introduction

Ed Corey, Inventory Biologist

North Carolina State Parks provide a safe haven for many rare and unique animals, plants and natural communities. Some are found only within the boundaries of a particular park, while others are simply considered uncommon or rare across all or part of their ranges. Inventories and monitoring are two activities that inform us what species and communities are present on a property and how they are faring. An inventory is a survey of natural resources, while a monitoring project checks the status of a resource over an extended period of time.

While the techniques used can be similar, generally speaking, the goals of an inventory are different from the goals of a monitoring project. Early on, the main purpose of an inventory may be to determine whether a species or community may be present in the area surveyed. Once a species has been located, a more thorough survey may establish a baseline population size or condition." Monitoring," on the other hand, takes place after the initial survey has been completed. Monitoring involves a structured data collection effort and the goal is to collect data that can be analyzed to see change over time.

Protection of rare resources is often the primary justification for DPR's acquisition of a property and once the property has been acquired, it's essential to protect rare species. When the Natural Heritage Program (NHP) identifies large tracts of high quality private land, they often suggest acquisition by an interested state agency, such as the Divison of Parks and Recreation (DPR). If DPR decides to acquire this land, it is then the task of the inventory biologist to retrieve existing data from site survey reports produced by the NHP, Wildlife Resources Commission studies which may be in place and myriad other sources, in an effort to design a park inventory. Taxa addressed by the surveys may vary by site but they typically include mammals, birds, reptiles, amphibians, fish, crayfish, terrestrial and aquatic mollusks, insects and plants. NHP site surveys focus mostly on natural communities and plants, so there are often fairly complete lists of these organisms already on file. These site reports are then augmented with surveys by the DPR inventory biologist.

Brown Trout monitoring at Stone Mountain. Photo by Marshall Ellis.

Different survey methods are useful for locating different species. Box live traps, such as Sherman or Tomahawk traps, are great for catching small mammals. Tin and plywood coverboards can provide artificial retreats for reptiles and amphibians. Minnow traps help to locate and identify aquatic species, such as fish, salamanders, crayfish and snails. Drift fences are useful for catching shrews, snakes, salamanders, frogs, lizards and arthropods.

Once the surveys have begun, it becomes imperative to keep good data on the findings. Dates, locations and other vital information collected by the inventory biologist will be added to the Natural Resources Inventory Database. A final report of activities is compiled and kept on file for future reference.

When a rare or uncommon species has been identified in the park, the next step is to decide if the organism should be monitored and whether the monitoring should be conducted by park staff or by another agency. Oftentimes, there already is a monitoring project established for the species of interest and the park may be added as a new site for that monitoring project. The Wildlife Resources Commission has ongoing monitoring on species, including reptiles, amphibians, birds, mammals, fish and mussels. Other agencies may monitor other taxa alongside park staff. For example, the Department of Transportation and the U.S. Fish and Wildlife Service have worked with staff at Hanging Rock for several years to monitor the transplant of Schweinitz's Sunflower, a state and federally endangered plant of open woods.

Schweinitz's Sunflower at Hanging Rock. Photo by Dave Cook.

If the site cannot be added to an existing monitoring effort and a species seems to be worthy of long-term study, the next step is for the park to work with the Natural Resources Program staff (the regional biologist and inventory biologist) to find an appropriate monitoring protocol for the resource of interest. DPR has approved Monitoring Guidelines specifically designed to assist with setting up a monitoring project. If for some reason an appropriate technique is not listed there, we can work together to find other resources to help maximize results. Normally, once a monitoring project is developed, ongoing monitoring and record keeping are handled by the park staff but Natural Resources Program staff may be available to assist with monitoring.

An ambitious goal would be for every park to have some sort of monitoring project in place. If you have an idea for a project, contact your regional biologist. They can help you evaluate your options, find monitoring protocols and decide how to make the project manageable and informative over the long term.

Resource Management Highlights from the Mountain Region

Following are some projects that occurred in DPR's mountain region parks in 2009.

South Mountains was incorporated into the Southern Blue Ridge Fire Learning Network, a collaborative fire management program among state, federal and private landowners. South Mountains was selected as a demonstration site and conducted a prescribed fire of approximately 400 acres.

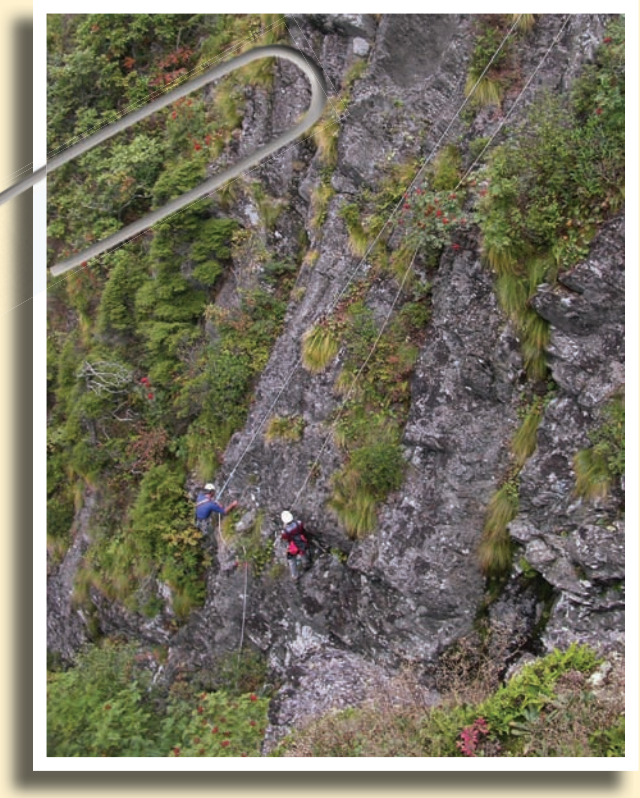
Pilot Mountain initiated fire management in its bear oak (Quercus ilicifolia) population. This is a state-listed species known to occur in only four locations in North Carolina, all on state parks.

DPR finished replacing old climbing anchors on the north face of Stone Mountain and in the primary climbing areas at Pilot Mountain. These were collaborative projects with the Carolina Climbing Coalition, which provided labor, tools and materials free of charge.

The Big Sandy Creek stream restoration project was completed at Stone Mountain. This project will significantly reduce sediment loads, improve water quality, and restore habitat.

A trout stream study was conducted at Stone Mountain in collaboration with fisheries researchers at NC State University.

Several mountain parks continued ongoing invasive species treatments. Lake Norman focused on privet, New River on multiflora rose and Pilot Mountain on tree of heaven.



Geum radiatum inventory at Elk Knob. Photo by Sue Cameron, U.S. Fish & Wildlife Service.

Chimney Rock initiated control of kudzu and princess tree.

Elk Knob initiated Southern Appalachian bog management at Pineola Bog State Natural Area.

Gorges initiated feral hog control with the Wildlife Resources Commission and the USDA's Animal and Plant Health Inspection Service.

Mount Mitchell continued its annual inventory of the federally endangered spreading avens (Geum radiatum) and Elk Knob initiated inventory of this cliff-dwelling species at The Peak. Elk Knob may host the world's largest population for this species, which is known from only fifteen sites in North Carolina and Tennessee. The annual inventories are conducted with the National Park Service and the U.S. Fish and Wildlife Service.

Hemlock Woolly Adelgid Treatments Begin in North Carolina State Parks

Marshall Ellis, Mountain Region Biologist

The history of biological threats in eastern forested ecosystems is a long one and includes such notorious players as chestnut blight, which eliminated the American chestnut from the southern Appalachians in the early twentieth century and the gypsy moth, which continues to defoliate deciduous forests from Virginia to Canada.

A new threat--the hemlock woolly adelgid (Adelges tsugae)--appeared in Virginia in 1951 and has now spread throughout the hemlock forests in the eastern United States, where it attacks Carolina and eastern hemlocks (Tsuga caroliniana and T. canadensis, respectively) of all ages and sizes. There are no natural predators for this pest. Dramatic hemlock mortality has been documented across our mountain park units in riparian corridors, on north-facing slopes and in the uncommon Carolina Hemlock Bluff natural community type, which occurs at Hanging Rock, New River and Chimney Rock state parks. The loss of the hemlock component in these ecosystems has potentially dire consequences for both aquatic and terrestrial biodiversity.

Experiments in biological control using two species of predatory beetles proved unsuccessful at Stone Mountain, Hanging Rock and Gorges but thanks to a collaborative program with the Division of Forest Resources (DFR), the U.S. Forest Service and a grant from the Duke Energy Foundation, 2009 has proven to be a watershed year for DPR in treating this pest. Working with Brian Heath from DFR's Morganton Forestry Center, seven state park units (Chimney Rock, Gorges, Hanging Rock, Lake James, New River, South Mountains and Stone Mountain) were selected for a pilot program in 2009. Chemicals, tools and training were provided free of charge to these parks and by the end of 2009, more than 1,000 hemlocks were treated in areas such as stream corridors, high-quality natural communities and campgrounds.

Chemical application to the roots of affected hemlocks at Chimney Rock. Photo by Marshall Ellis.

These areas were selected as high priorities primarily because of their ecological importance, large numbers of hemlocks, ease of access and aesthetic value. Treatments are anticipated to be effective for two to three years on average and additional sites will be targeted and treated in 2010 and beyond, with the strategy being to treat or re-treat as many sites as possible.

Hemlock Woolly Adelgid Treatments Begin in North Carolina State Parks (cont.)

Two parks--Chimney Rock and Grandfather Mountain--were treating the adelgids prior to their recent acquisition by DPR, so they already have sites in treatment rotations, with more sites in development. DFR has agreed to continue funding this project and 2010 will include the use of new chemical formulations that will allow us to more easily treat remote areas. Although it is too soon to know the effects of these first treatments, identical programs undertaken elsewhere by the National Park Service, the U.S. Forest Service, The Nature Conservancy and DFR have yielded excellent results.

A second funding source has been provided by the Duke Energy Foundation, which awarded a $5,000 grant to DPR for invasive species control. This grant will be used to purchase soil injectors, which will greatly expand the scale and efficiency of treatment and will allow us to reach many new areas. Although we cannot expect to eradicate the adelgids, this program will ensure that we can maintain selected high-quality riparian corridors and other sites as researchers continue to search for additional treatment options.

Carolina hemlock (Tsuga caroliniana). Photo by Dave Cook.